

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
18 August 2005 (18.08.2005)

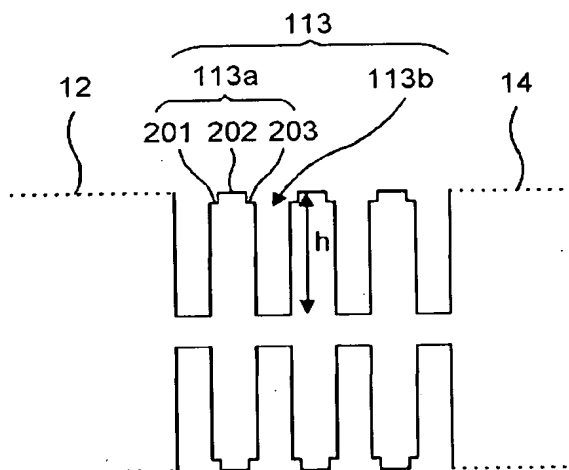
PCT

(10) International Publication Number  
WO 2005/076374 A1

- (51) International Patent Classification<sup>7</sup>: H01L 33/00
- (21) International Application Number:  
PCT/KR2005/000360
- (22) International Filing Date: 5 February 2005 (05.02.2005)
- (25) Filing Language: Korean
- (26) Publication Language: English
- (30) Priority Data:  
10-2004-0007541 5 February 2004 (05.02.2004) KR
- (71) Applicant (for all designated States except US): EPIVAL-  
LEY CO., LTD. [KR/KR]; 51-2, Neungpyeong-ri, Opo-  
eup, Kwangju-si, Kyunggi-do 464-892 (KR).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): PARK, Joongseo  
[KR/KR]; 606-103, Samsung Raemian 6-cha Apt., 1167,  
Bojeong-ri, Kuseong-eup, Yongin-si, Kyunggi-do 449-564  
(KR).
- (74) Agent: AN, Sang Jeong; 512-1906, 221, Gumi-dong,  
Bundang-gu, Seongnam-si, Kyunggi-do 463-715 (KR).
- (81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,  
MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH,  
PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN,  
TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— with international search report  
— before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

[Continued on next page]

(54) Title: III-NITRIDE COMPOUND SEMICONDUCTOR LIGHT EMITTING DEVICE



(57) Abstract: The present invention relates to a III-nitride compound semiconductor light emitting device comprising an active layer with the multi-quantum wells interposed between an  $n\text{-In}_x\text{Al}_y\text{Ga}_z\text{N}$  ( $x+y+z=1$ ,  $0<x<1$ ,  $0<y<1$ ,  $0<z<1$ ) layer and a  $p\text{-In}_x\text{Al}_y\text{Ga}_z\text{N}$  ( $x+y+z=1$ ,  $0<x<1$ ,  $0<y<1$ ,  $0<z<1$ ) layer, wherein the active layer comprises an alternate stacking of a quantum-well layer made of  $\text{In}_x\text{Ga}_{1-x}\text{N}$  ( $0.05<x<1$ ) and a sandwich barrier layer, the sandwich barrier layer comprising a first outer barrier layer of  $\text{In}_a\text{Ga}_{1-a}\text{N}$  ( $0<a<0.05$ ), a middle barrier layer of  $\text{Al}_y\text{Ga}_{1-y}\text{N}$  ( $0<y<1$ ) formed on the first outer barrier layer and a second outer barrier layer of  $\text{In}_b\text{Ga}_{1-b}\text{N}$  ( $0<b<0.05$ ) formed on the middle barrier layer, thereby a high-efficiency/high-output light emitting device with high-current and high-temperature properties can be obtained, and it is possible to easily achieve a high-efficiency green light emission at a wavelength equal to or over 500 nm, and high-efficiency near UV light emission.

WO 2005/076374 A1



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*